Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of	)	
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
	)	
	)	

To: The Commission

COMMENTS OF CISCO SYSTEMS, INC.

CISCO SYSTEMS, INC.

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SUMMARY

Like President Obama, Congress and the Commission, Cisco envisions a world in which Americans living in even the most remote areas enjoy next-generation voice, video, and data applications; where residents living hundreds of miles from a city can secure the very best medical care remotely; where energy use and distribution is metered and managed via communications technology to minimize waste; where first responders can rely on a nationwide, interoperable communications network; and where intelligent transportation systems mitigate traffic and minimize fuel use. The National Broadband Plan ("Plan") can play a central role in turning this vision into reality, and offers Commission a chance to orient American policy decisively in the direction of deployment, use, and innovation.

The Plan should set forth a comprehensive and ongoing strategy for the deployment and use of next-generation networks. The Recovery Act's text calls for a Plan that aims for the provision of service to *all* Americans. That text also makes clear Congress's preference for a Plan that promotes service provisioned by the private sector wherever possible. In particular, the Plan should work to promote facilities-based competition among providers relying on varied broadband platforms. The Recovery Act also directs that the Plan must ensure the incorporation of communications technologies into fields such as health care, workforce management, education, energy independence, and others. In pursuing these goals, the Commission must not tie itself to specific measures of speed, but must – consistent with the statute – strive for ever-better communications services, benchmarking progress against domestic goals and the state of broadband offerings elsewhere. Likewise, the Commission should not focus exclusively on the "last mile," but rather should recognize growing demands on the "middle mile" and the importance of backhaul upgrades to federal policy objectives.

The Commission should also recognize that other governmental actors will play a central role in any successful policy framework. The Plan must contemplate actions by the myriad government actors with jurisdiction over health care, energy, transportation, taxation, trade policy, and other diverse fields. Even within the realm of "core" communications policy, the Commission may well require additional action by Congress to effectuate its policy goals. The Plan should thus propose closer coordination of broadband policy between the Commission, the White House, and relevant executive agencies, and should where necessary recommend appropriate legislative action. In particular, the Commission should promote a framework in which it – and other agencies – must consider the impact of any proposed rule on the national broadband goals, and justify any negative effect before adopting the rule.

The Commission should likewise make clear that a broadband Plan will need to be revisited and revised over time if it is to succeed. Even the best-laid Plan could well go awry, because even the most astute analysts cannot clearly foresee in 2009 the state of the communications market several years hence. The Commission should therefore commit to ongoing reevaluation of the Plan.

In setting goals, the Plan should "aim high." The Commission should aspire to ensuring that 100 percent of Americans have access to both (1) a connection offering 100 Mbps per second both upstream and downstream; and (2) a 4G or better mobile connection. Likewise, the Commission should aim for these connections to have limited latency and jitter to allow for high quality real-time applications to run without degradation. Broadband leadership involves a

combination of availability (i.e., penetration) and *quality*. Broadband quality is itself multi-dimensional, reflecting actual (not "advertised") downstream and upstream throughput, latency, and jitter. Different applications will require these attributes in different combinations. While working to mitigate latency and jitter, the Plan should aim for ever-increasing speeds capable of handling tomorrow's applications (including visual networking, high-definition video streaming, and TelePresence) and 100 percent availability.

In striving to fulfill whatever objectives it sets, the Commission should rely first and foremost on private sector investment. Cisco predicts explosive growth in Internet traffic to continue over the coming years, driven by the rise of video traffic, which will soon account for the vast majority of all public Internet traffic. Other developments, including the growth of cloud computing, collaboration and telework technologies, and telemedicine, will further fuel broadband usage and adoption. These demand drivers are likely to fuel private investment in broadband. To help ensure that they do, the Plan must be designed to promote investment and bolster regulatory stability. The Commission should recognize that the more intensely regulated the communications sector is, the more risk will be assigned by capital markets wary of the potential of disruptive regulatory decisions. In particular, the Commission must resist calls for mandatory nondiscrimination requirements above and beyond those set forth in the *Internet Policy Statement*. The flexibility afforded by the Commission's current broadband policy framework has produced a wealth of services and applications that might not have arisen under a strict non-discrimination regime.

However, a viable Plan must also recognize that broadband networks will simply not be economic in some areas absent government support. In those areas, the government will need to subsidize broadband deployment. First, the Commission should encourage President Obama and Congress to pursue additional rounds of federal support for next-generation networks in areas that will otherwise be left behind. Second, the Commission should reform the High-Cost Universal Service program to promote the consistent improvement of existing broadband networks. Third, the Commission should expand and make permanent the Rural Health Care Pilot Program, which connects rural health providers of all sizes to Internet backbones and thus enables rural Americans to benefit from advanced telemedicine applications. To assist in each of these areas, the Commission's efforts will be aided by a nuanced broadband map reflecting availability, speed, quality, and uptake on a household-by-household level. The Commission should work to ensure the timely development of such a map.

While deployment is critical, the Plan must also focus on broadband adoption. In many areas, consumers have declined to subscribe to broadband services that are available, very often because they cannot afford the service or do not believe it to be worth the price. The problem is especially acute among low-income and rural Americans. As the Commission well knows, non-subscribers are deprived of a wide range of opportunities enjoyed by subscribers. The Commission should therefore take several actions to boost adoption. First, it should assume a deferential stance toward experimental pricing frameworks – such as "tiered" service offerings – employed by providers to reduce costs for low-volume users. The Plan should also recognize the key role that new and emerging applications – particularly those involved in the health care, education, remote work/collaboration, and energy sectors – will play in promoting demand, and should promote the integration of communications offerings in each of these fields. Finally, the Commission should also act on pending petitions to expand the Link-Up and Lifeline programs to support broadband adoption.

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COMMENTS OF CISCO SYSTEMS, INC.

Cisco Systems, Inc. ("Cisco"), the world's largest provider of networking technology, equipment, solutions and services used in the construction and management of next-generation broadband networks, applauds the Commission for its thoughtful and comprehensive *Broadband Plan NOI*. Broadband service has improved the lives of Americans in myriad ways, is poised to do much more going forward. Like President Obama, Congress and the Commission, Cisco envisions a world in which Americans living in even the most remote areas enjoy next-generation voice, video, and data applications; where residents living hundreds of miles from a city can secure the very best medical care remotely; where energy use and distribution is metered and managed via communications technology to minimize waste; where first responders can rely on a nationwide, interoperable communications network; and where intelligent transportation systems mitigate traffic and minimize fuel use. As the *NOI* makes clear, communications offerings have become inherently intertwined with nearly all aspects of our lives.[1] But, as Acting Chairman Copps has also pointed out, "all this progress is only a small part – just

[1] *See A National Broadband Plan for Our Future*, Notice of Inquiry, GN Docket No. 09-51 (rel. Apr. 8, 2009) ("*NOI*").

prologue – to what this technology is going to do to change our lives in the years ahead."[2] While America has made great strides in promoting the deployment and use of next-generation networks, much work needs to be done if we are to surmount the many challenges facing our nation –with respect to both broadband and many other issues. The National Broadband Plan ("Plan") contemplated by Congress can play an unparalleled role in ensuring that those challenges are met. Properly framed, that Plan can ensure that the proliferation and use of communications technology is at the heart of federal policy-making efforts – not only at the Commission, but throughout the government – as it must be if our aspirations are to become reality. The Plan offers the Commission a chance to orient American policy decisively in the direction of deployment, use, and innovation. The Commission should embrace this opportunity, developing and relying on empirical tools to measure success, replicating successful strategies while jettisoning those that do not work, and enlisting private and public resources in the effort to safeguard America's broadband future.

I. THE PLAN SHOULD SET FORTH A COMPREHENSIVE AND ONGOING STRATEGY FOR THE DEPLOYMENT AND USE OF NEXT-GENERATION NETWORKS.

A. The Commission Should Heed the Recovery Act's Language in Structuring the Plan.

The Commission's effort to craft a successful Plan must begin with the text of the Recovery Act itself. That text calls for a "national broadband plan" that "seek[s] to ensure that all people of the United States have access to broadband capability and shall establish benchmarks for meeting that goal." The Plan must include "an analysis of the most effective and efficient mechanisms for ensuring broadband access by all people of the United States," as well

[2] *Id.*, Statement of Acting Chairman Michael J. Copps.

as "a detailed strategy for achieving affordability of such service and maximum utilization of broadband infrastructure and service by the public" and "a plan for use of broadband infrastructure and services in advancing consumer welfare, civic participation, public safety and homeland security, community development, health care delivery, energy independence and efficiency, education, worker training, private sector investment, entrepreneurial activity, job creation and economic growth, and other national purposes."[3]

This language highlights several points that must (not "should," but "must") guide the Commission's efforts. First, the Plan must aim for the provision of service to *all* Americans. In the Recovery Act's language, the broadband plan must "seek to ensure that *all people of the United States* have access to broadband capability," and must "include … an analysis of [means] for ensuring broadband access by *all people of the United States*."[4] The Commission should set aside any notion that Congress contemplated a plan for serving only a subset of Americans. Even if there were sensible reasons to leave some Americans behind – and there are not – Congress has foreclosed this option.

Second, while Cisco strongly supports the use of government subsidies to ensure service in some cases,[5] it emphasizes that Congress has directed the Commission to seek out sustainable business models for broadband service wherever possible. Specifically, Congress emphasized the importance of "*effective and efficient* mechanisms for ensuring broadband access by all people of the United States," and required a "detailed strategy for achieving *affordability* of such

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[3] American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115 at § 6001(k) (2009) ("Recovery Act").

[4] Recovery Act § 6001(k)(2), (k)(2)(A) (emphases added).

[5] *See infra* Part III.B.

service."[6] Congress's references to "efficien[cy] and "affordability" signal a focus on private-sector solutions, which are most likely to be self-sustaining without regular infusions of public capital. These projects – those powered by the provision of service at rates that render service desirable to providers and end-users alike – are easily the most likely to be "effective" in the long term.

Of course, affordability also will depend on the market's most important component – competition. In particular, the Commission must continue to pursue competition between and among different technological platforms. Unlike the synthetic competition generated by network-sharing mandates, facilities-based competition has dramatically reduced prices for end-users, drawing telecommunications companies into the video market, cable providers into the telephony market, satellite providers into both those markets, and all three – along with wireless carriers – into the burgeoning Internet access market. To fulfill the Recovery Act's demands, the Commission must promote the inter-platform competition that will "effective[ly]" and "efficient[ly]" ensure "afforab[le]" service for American end users.

Third, the Plan must ensure not only deployment and use, but also the incorporation of communications technologies into fields such as health care, telework, distance learning, energy management, and others. The Recovery Act is clear: The FCC's Plan "shall … include … a plan for use of broadband infrastructure and services in advancing consumer welfare, civic participation, public safety and homeland security, community development, health care delivery, energy independence and efficiency, education, worker training, private sector investment, entrepreneurial activity, job creation and economic growth, and other national

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[6] Recovery Act § 6001(k)(2)(A) (emphases added).

purposes." In other words, Congress recognized that the ubiquitous proliferation and use of broadband technologies into areas from which those technologies have been absent is integral to our collective success going forward, and demanded a Plan that ensured such proliferation.

Fourth, the Commission must account not only for what Congress did say, but also for what Congress did *not* say, in its provisions describing the Plan. Both in establishing new subsidy programs and in mandating the creation of a broadband plan, Congress carefully avoided any language suggesting that federal goals should be considered met upon the provision of service at any pre-defined minimum speed threshold. Indeed, the final version of the Act declined to incorporate specific language appearing in earlier versions pertaining to speed thresholds.[7] The Commission should not read such thresholds into the Act, but rather should continuously revise its expectations upward as the demands placed on broadband networks change. As the Commission's revised Form 477 recognizes, the range of speeds referred to as "broadband" is very wide, from the 200 Kbps speeds now known as "First Generation Data" to the "greater than 100 Mbps" speeds known as "Broadband Tier 7." A policy framework that aspired only to 200 Kbps – or even to a much higher static level – would fail to deliver the "evolving level of telecommunications service" that Congress directed the Commission to pursue in 1996.[8] Rather, the Commission must consistently benchmark the state of the technologies and

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[7] *See* Congressional Record – House, Feb. 12, 2009, at H1514 (describing speed thresholds in House of Representatives version of Recovery Act); *Doe v. Chao*, 540 U.S. 614, 622 (2004) (explicit Congressional rejection of statutory text "precludes any hope of a sound interpretation" reflecting excised language); *Runyon v. McCrary*, 427 U.S. 160, 174-75 (where "Congress … specifically considered and rejected an amendment" to draft legislation, "[t]here could hardly be a clearer indication" of Congressional opposition to the relevant language).

[8] 47 U.S.C. § 254(c)(1).

networks in use in the United States against its own goals and against the offerings available elsewhere, and must keep working to improve the services available to American citizens.

Congress similarly declined to limit its goals to the deployment of last-mile facilities. End users in unserved and underserved areas will also be in need of new or improved capacity at the "middle mile" – links connecting their homes and neighborhoods to larger backbone networks, and thus connecting them to the host of online offerings that well-served Americans have come to rely on. Even existing middle-mile networks may well be unable in some places to carry the increased traffic loads that will attend any expansion of last-mile capacity. As Cisco explained last year in a public White Paper,[9] the continued rise of applications relying on streaming video content has completely transformed Internet usage patterns. Internet video content now comprises about one-quarter of all consumer Internet traffic, and even that figure excludes peer-to-peer traffic involving the exchange of video files.[10] By 2012, video traffic will comprise 90 percent of consumer traffic, and nearly 400 times the capacity of the entire Internet backbone of 2000. By that point, the Internet on the whole will carry 75 times as much traffic as it did in 2002.[11] This stark growth in bandwidth demand is bound to strain existing middle-mile networks. The Commission must recognize this fact, and must account for backhaul networks in formulating and executing its broadband plan.

In short, the Commission should pay close attention to the Recovery Act's language in formulating the Plan: It should aspire toward 100% adoption, seek to support sustainable

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[9] *See* Cisco White Paper, *Approaching the Zettabyte Era* (June 2008) ("*The Zettabyte Era*"), *available at* http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-481374_ns827_Networking_Solutions_White_Paper.html.

[10] *See id.*

[11] *Id.*

broadband business plans, focus on the integration of broadband technologies into all aspects of American life, and define "broadband" expansively.

B. The Plan Should Recognize the Critical Role for Other Government Actors in Promoting Broadband Deployment and Adoption.

In drafting the Plan, the Commission must acknowledge that other governmental actors will play a central role in any successful policy framework. A National Broadband Plan will, to be sure, require FCC action – action to ensure a stable environment for broadband investments, to develop and administer necessary subsidies, and so forth – but the Plan cannot be limited to the traditional tools of communications policy. As discussed above, communications technologies are playing a greater role in all areas of our society: These technologies are poised to deliver dramatic improvements in how we work, live, play and learn; how we care for the sick and elderly; how we manage and conserve our energy resources; how we control traffic; and how we ensure a full life for those with disabilities. A successful broadband plan must contemplate actions by the myriad government actors with jurisdiction over these areas, including the Departments of Energy, Education, Health and Human Services, and Transportation, to name but a few. Likewise, the success of the American broadband industry will depend on appropriately structured taxation and trade policies and will therefore require attention by Congress and other actors. Indeed, even within the realm of "core" communications policy, the Commission may well require additional action by Congress to effectuate its policy goals, for even its "ancillary jurisdiction" is carefully limited to cases in which its action is necessary to the achievement of a statutorily mandated objective.[12]

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[12] *See United States v. Southwestern Cable Co.*, 392 U.S. 157, 178 (1968).

For all these reasons, the Commission's broadband Plan must include proposed action items for other governmental entities. For example, the Commission should propose closer coordination of broadband policy between itself, the White House and the various executive agencies mentioned above. Likewise, as the expert agency issuing a Congressionally mandated report, the FCC should not hesitate to recommend appropriate legislative action, to ensure that necessary reforms are not hamstrung by years of litigation over the Commission's legal authority. In each of these cases, the Commission's activities should be led by one overarching goal: To ensure that federal broadband policy is driven not by ad-hoc and decentralized decision-making, but rather by coordinated strategic action. Put simply, the deployment and use of next-generation communications networks should be placed at the heart of federal policy.

To this end, the Commission should think aggressively in promoting broadband goals in relation to other federal goals. Internally, it can do so by soliciting, in each and every rulemaking proceeding, comment on how any rules adopted will impact the nation's goals regarding broadband deployment and adoption, and including discussion of this impact in the related orders. This process could be modeled on the process under which the Commission now satisfies its responsibilities under the Regulatory Flexibility Act ("RFA"):[13] Decisions contrary to the nation's broadband goals would be permitted, but only when explained and justified based on the comments received. Likewise, the Commission might propose a legislative requirement that *every* federal agency, in considering new rules on any subject, consider the new policy's likely effect on broadband deployment and uptake, and justify any deleterious effects before adopting the rule.

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[13] 5 U.S.C. § 601 et seq.

C. The Commission Should Regularly Revisit and Revise Its Broadband Plan.

The Commission should likewise make clear that a broadband Plan will need to be revisited and revised over time if it is to succeed. While Cisco applauds Congress's vision in directing the Commission to draft the Plan at issue here, a single Plan – however comprehensive and forward-looking – will not achieve our national goals. Our nation's communications needs are constantly evolving, often at a pace that defies even the most aggressive predictions. The drafters of the 1996 Act barely foresaw the rise of the Internet. Today, the Internet is a defining feature of American life, and is growing wildly: As mentioned above, Cisco predicts that the Internet of 2012 will carry 75 times as much traffic as it did in 2002.[14]

Moreover, the evolution in bandwidth needs is not by any means the only relevant variable. The optimal policy framework at any given time will depend on countless unknowable factors, including the state of international trade, overall taxation policy, political developments in the United States and elsewhere, the speed with which competing business models wax and wane, and – most of all – the unpredictable development of game-changing technologies and applications that might dramatically reshape supply, demand, market concentration, and other former "givens."

In short, even the best-laid Plan could well go awry, because even the most astute analysts cannot clearly foresee in 2009 the state of the communications market several years hence. Thus, whatever Plan the Commission adopts is likely to require revision as time passes. The Commission should therefore commit to ongoing reevaluation of the Plan. It might elect to seek a Congressional mandate for this ongoing action (ideally accompanied by funding to ensure

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[14] *The Zettabyte Era*.

the project's continued viability), or, barring such a mandate, could well undertake continued revision of the plan in connection with its existing responsibilities under Section 706 of the 1996 Act.[15]

In addition, the Commission should use its plan to request that any legislative action regularizing the broadband Plan obligation should include language encouraging or requiring other governmental actors to honor the Commission's conclusions insofar as they touch on areas relating to broadband but outside the FCC's legal bailiwick. As noted above, these other entities will be essential partners in furthering the use of broadband in fields such as health care, energy, telework, and distance learning, and Congressional action could help ensure their cooperation with the Commission's Plan.

II. THE PLAN SHOULD ACCOUNT FOR QUALITY AS WELL AS SPEED, CONSISTENTLY REVISE EXPECTATIONS UPWARD, AND ASPIRE TO 100% COVERAGE.

In defining "broadband" for purposes of policymaking, the Commission should think multi-dimensionally, aim high, and consistently revise its expectations upward. In establishing these goals, the Commission should not be hamstrung by concerns over the current technical or economic feasibility of these aspirations – the point is to mobilize policymaking efforts to come as close as possible to the stated goal given existing technical or economic constraints.

In Cisco's view, the Commission should aspire to ensure that 100 percent of Americans have access to both (1) a connection, provided via fiber-optics, cable, wireless, or other

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[15] Section 706 requires the Commission to "regularly … initiate a notice of inquiry concerning the availability of advanced telecommunications capability to all Americans (including, in particular, elementary and secondary schools and classrooms)" to "determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion." 47 U.S.C. § 157 nt.

technology, offering 100 Mbps per second both upstream and downstream; and (2) a 4G or better mobile connection. Likewise, the Commission should aim for these connections to have limited latency and jitter to allow for high quality real-time applications to run without degradation.

The reasons for setting the bar high are several. First, the Commission must recognize that "availability" is not the only relevant dimension along which to measure broadband deployment. Rather, the Commission must track and promote progress along several different fronts. Broadband leadership involves a combination of availability (i.e., penetration) and *quality*. While most measures of broadband have focused exclusively on availability, quality is actually the most important factor in ensuring a positive consumer experience online. Broadband quality is itself multi-dimensional, reflecting actual (not "advertised") downstream and upstream throughput, latency, and jitter. Different applications will require these attributes in different combinations. Today's network is well-suited to today's most-used applications (including social networking, low-definition video streaming, e-mail, and so on). Tomorrow's requirements are a different matter. Cisco, in partnership with two universities, has evaluated the broadband services available in a wide range of nations, and has found that only one – Japan – enjoys broadband quality sufficiently robust to handle *tomorrow*'s most important applications (including visual networking, high-definition video streaming, and TelePresence).[16] Thus, any broadband Plan must measure and promote improvements in broadband *quality* as well as broadband *availability* in order for America's networks to be ready for tomorrow's applications.

Second, with respect to speeds, the Commission should take a functional approach, focusing on the evolving ways in which users rely on broadband networks rather than on static

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[16] *See* Cisco Systems, Oxford University Said Business School & Universidad de Oviedo, *Broadband Quality Score: A Survey of Broadband Quality* (September 2008).

throughput cut-offs. Cisco recently urged NTIA and RUS to define the terms "unserved" and "underserved" in a manner that focused on the technological capability of the service currently available in a given area.[17] Specifically, Cisco urged that an area should be deemed "unserved" for Recovery Act purposes if there is no terrestrial (i.e., non-satellite) service offering downstream speeds of 768 Kbps or above – *i.e.*, no service qualifying as "basic broadband" under the framework recently established by the Commission.[18] An area should be deemed "underserved" if a substantial portion of the population lacks access to services capable of accommodating telemedicine, distance-learning, remote location work, VoIP, streaming media, and similar "core" broadband offerings. But even areas not meeting these definitions require substantial improvements, given that Internet traffic generally doubles every several years.[19] The Plan must be structured to foment investment and innovation in all spheres of the

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[17] *See* Comments of Cisco Systems, Inc., *American Recovery and Reinvestment Act of 2009 Broadband Initiatives*, Docket No. 090309298-9299-01 (filed Apr. 13, 2009).

[18] *Development of Nationwide Broadband Data to Evaluate Reasonable and Timely Deployment of Advanced Services to All Americans, Improvement of Wireless Broadband Subscribership Data, and Development of Data on Interconnected Voice over Internet Protocol (VoIP) Subscribership*, 23 FCC Rcd 9691, 9701 ¶ 20 n.66 (2008).

[19] *The Zettabyte Era*. In addition to the applications discussed above, communications networks are being further strained by the rise of "cloud computing." Since the dawn of the personal computer, users have relied extensively on applications that reside on their own devices, ranging from word processors to spreadsheets to entertainment libraries to games. Advances in computing power and communications capability, however, are leading to a paradigm shift, in which users will often rely on applications resident on remote computers, much in the way that they now rely on certain applications that remain resident on a remote web site. Thus, for example, rather than using an installed word processor, a user might rely instead on a program on a distant computer, operated virtually over a computer network. This approach – known as "cloud computing" on account of the fact that the applications reside in the Internet "cloud" – offers several advantages, permitting real-time collaboration and automatic updates as well as the use of innovative pricing frameworks that do not require the licensing of software for unlimited use. But, perhaps needless to say, cloud computing also requires the use of stable and reliable bandwidth.

communications industry, to ensure the consistent growth of American opportunity and competitiveness.

Third, as discussed more fully above,[20] the Commission should continuously revise its expectations upward as the demands placed on broadband networks change. Over time, common applications will require more capacity, more symmetry, less latency and less packet loss, and the Plan should adapt to these evolving needs.

Fourth, as previously noted, the Plan should aspire to nothing short of 100% broadband availability. The Commission should use all the tools at its disposal to identify unserved and underserved areas, as well as served areas with low subscription rates. Above all else, the Commission should rely on empirical data and act pragmatically, not dogmatically. For example, the Commission should pay careful attention to the results of the broadband grant and loan programs being administered by NTIA and RUS, as well as to various state broadband programs, and should be willing to incorporate lessons learned in those contexts into its own policy-making. Moreover, as discussed in greater detail below, the Commission should work to ensure the creation of a detailed, nuanced, and consistently updated broadband inventory map, on which it should rely in identifying areas in need of assistance and in crafting policies to remedy deficiencies.

With its goals correctly set to support future broadband applications and uses, the plan should also operate to support private investment where possible, but provide for public subsidization where necessary to advance the availability and affordability requirements Congress specified. .

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[20] *See supra* Part I.C.

A. The Plan Should Rely Principally on Private Investment.

In striving to fulfill whatever objectives it sets, the Commission should rely first and foremost on private sector investment.[21] This approach is supported by the Recovery Act's text, and most consistent with the aims of sustainable and continued investment. To maximize private sector involvement in furthering deployment, the Commission should pursue policies that promote stability and deployment, and should reject calls for blanket non-discrimination requirements.

1. The Plan should promote a stable, pro-investment regulatory environment.

While public subsidies are needed and will continue to be needed in some areas, the stage is set for continued dramatic private investment in broadband networks. As described above, Cisco predicts explosive growth in Internet traffic to continue over the coming years, driven by the rise of video traffic, which will soon account for the vast majority of all public Internet traffic. Other developments, including the growth of cloud computing, collaboration and telework technologies, and telemedicine, will further fuel broadband usage and adoption. To help ensure that these developments do in fact direct private capital to the construction of next-generation networks, the Plan must be designed to promote investment and bolster regulatory stability. In particular, the Commission should recognize that the more intensely regulated the communications sector is, the more risk will be assigned by capital markets wary of the potential of disruptive regulatory decisions. In this context, unnecessarily high risk raises costs and slows deployment.

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[21] *See supra* Part I.A.

Some of the necessary steps are outside the Commission's core sphere of responsibility; in those cases, the Plan should urge action by other governmental entities that will support the drive toward investment and innovation. For example, the Plan should include calls for Congressional support of the largely-liberalized trade policy for information and communications technology, and more open flows of capital and labor in the global high-technology market. Likewise, the Plan should propose the elimination of tax and accounting requirements that penalize investment or undermine incentives to manufacture information technology products. The Plan should also promote long-term innovation in the high-technology and communications space by urging the use of tax credits for research and development and similar devices to ensure that the United States maintains its leadership role in the global economy.

More broadly, the Plan should propose a framework under which *all* aspects of federal policy – and certainly all aspects within the Commission's jurisdiction – are evaluated on the basis of the impact they might have on the deployment and use of next-generation communications technologies. Cisco recognizes that other policy objectives may sometimes trump the national broadband imperative, but federal entities should not be permitted to take action in derogation of that imperative without explaining why such action was necessary and demonstrating that steps were taken to mitigate any negative impact on communications goals.

Of course, many critical steps toward a stable, pro-investment regime *will* be within the Commission's control. For example, the Commission should maintain its commitment to technological neutrality, to ensure that decisions between and among different broadband platforms are driven by considerations of cost and functionality, not by regulatory fiat. Likewise, the Commission should decline to revisit critical decisions regarding IP-enabled applications and the high-speed networks on which they ride. For three decades – beginning

with the first *Computer Inquiry* decisions issued under President Carter – the Commission has recognized the important distinctions between these next-generation services, on the one hand, and legacy monopoly services such as telephony or cable television, on the other. Thus, the Commission has wisely protected high-speed broadband networks from extensive federal and state regulation, even while standing ready to correct market abuses when they occur. This course has resulted in the emergence of a vibrant, multi-platform broadband market that offers the great majority of Americans a choice of three or more providers (wireline, cable, and terrestrial wireless), and that is becoming more competitive every day. Thus, while there are clearly discrete weaknesses in existing federal broadband policy, the Commission should reject calls for a blanket repudiation of its long-standing framework.[22]

The Commission should also continue to pursue spectrum policies that drive the deployment of high-speed wireless services to unserved and underserved end users. First and foremost, the Commission should continue to explore the possibility of making additional federal and non-federal spectrum available for wireless broadband services. In this regard, the Commission should urge NTIA to begin an immediate assessment of current federal spectrum use, and to harness the Commercial Spectrum Enhancement Act to swiftly free additional spectrum resources and/or promote spectrum sharing. The Commission's wireless strategy, centered on liberal, market-based spectrum allocations, has led to proliferating licensed and unlicensed services, including WiMAX, HSDPA, and LTE, to say nothing of the satellite-based offerings that serve America's most hard-to-reach areas. The Commission should maintain its

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[22] *See, e.g.*, S. Derek Turner, Free Press, *Dismantling Digital Deregulation: Toward a National Broadband Strategy*, *available at* www.freepress.net/files/Dismantling_Digital_Deregulation.pdf.

commitment to flexible policies that put spectrum in the hands of the providers who can use it best to serve the needs of American citizens.

2. The Plan should reject bright-line anti-discrimination rules.

In particular, the Commission must resist calls for mandatory nondiscrimination requirements above and beyond those set forth in the *Internet Policy Statement*.[23] The flexibility afforded by the Commission's current broadband policy framework has produced a wealth of services and applications that might not have arisen under a strict non-discrimination regime. One prominent example is Cisco's high definition TelePresence conferencing system. TelePresence creates an experience that is almost lifelike through the use of multiple high quality cameras, directional audio, and displays at twice the resolution of HDTV (using 1080P panels). TelePresence works across an IP network using the same technology as VoIP, but requires symmetrical connections of approximately 12 Mbps. The packets carrying TelePresence traffic require a highly managed network to deliver them at the appropriate time. The public Internet, unmanaged, is not currently capable of providing the consistent quality of service necessary to run enterprise quality TelePresence. But using network management tools that give preference to certain packets, it will be possible to run TelePresence and similar applications over the public Internet as effectively as they are run on private networks today.

To be clear, Cisco supports the *Internet Policy Statement* and applauds the important role it has played in policing the broadband market. Cisco has been involved in the "network neutrality" discussion from the beginning as a participant in the drafting of the High-Tech Broadband Coalition's "connectivity principles," and has long supported the policies reflected in

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[23] *Appropriate Framework for Broadband Access to the Internet over Wireline Facilities et al.*, CC Dkt. No. 02-33 et al., 20 FCC Rcd 14986 (2005).

the *Policy Statement*. In a September 2003 letter and several subsequent filings, the HTBC urged the adoption of four specific "connectivity principles."[24] The *Internet Policy Statement* largely reflected those principles.

The *Policy Statement* has proved to be an effective tool in influencing providers' actions. The day it adopted the *Policy Statement*, the FCC warned that "if we see evidence that providers of telecommunications for Internet access or IP-enabled services are violating the[] principles, we will not hesitate to take action to address that conduct."[25] Since then, the FCC has forcefully asserted its prerogative to take enforcement action in connection with violations of the *Policy Statement*.[26] But the *Policy Statement* has played a critical role in the development of the broadband market even in the absence of affirmative enforcement action. For example, the *Policy Statement* articulates the FCC's expectations regarding how providers may and may not behave vis-à-vis their customers, helping to ensure that users understand their entitlement to access the content and applications of their choice and thereby deterring unreasonable conduct before it occurs.

Importantly, however, the *Policy Statement* declines to impose bright-line rules, recognizing that the needs of consumers will best be served by case-specific analysis that reflects the evolving needs and capabilities of broadband networks, including the notion that

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[24] HTBC Letter to Chairman Powell, September 25, 2003, CS Docket No. 02-52; GN Docket No. 00-185; CC Docket Nos. 02-33, 95-20 & 98-10.

[25] *See Appropriate Framework for Broadband Access to the Internet over Wireline Facilities*, 20 FCC Rcd 14853, 14903 ¶ 96 (2005).

[26] *Formal Complaint of Free Press and Public Knowledge Against Comcast Corporation for Secretly Degrading Peer-to-Peer Applications; Broadband Industry Practices Petition of Free Press et al. for Declaratory Ruling that Degrading an Internet Application Violates the FCC's Internet Policy Statement and Does Not Meet an Exception for "Reasonable Network Management"*, 23 FCC Rcd 13028 (2008) ("*Comcast Order*").

discrimination in the treatment of packets can produce a pro-consumer result. In its recent *Comcast Order*, the Commission "decline[d] to adopt prophylactic rules" regarding broadband interconnection and nondiscrimination, and instead declared its intent "to adjudicate disputes regarding federal Internet policy on a case-by-case basis."[27] The Commission noted that this course was most appropriate, because "the Internet [is] new and dynamic" and "Internet access networks are complex and variegated."[28] Moreover, the case-by-case approach was most consonant with "federal policy advocat[ing] the preservation of the 'vibrant and competitive free market' for Internet and interactive computer services."[29] Then-Commissioner Copps noted that he "ha[d] long advocated … a case-by-case analysis of the facts in particular cases," and Commissioner Adelstein lauded the "flexibility" afforded by the FCC's "case-by-case approach."[30]

This case-by-case approach is especially important in assessing providers' evolving network-management efforts. Providers manage packets for many reasons: To maintain network security, controlling the proliferation of spam, spyware, worms, and other "malware"; to provide parents and libraries appropriate discretion over the content accessed by children; to hamper the unlawful dissemination of intellectual property; and – perhaps most significantly – to ensure quality of service is maintained as the demands placed on the Internet skyrocket. Packet-management tools are also central to managed applications such as TelePresence conferencing. As underscored by the Commissioners' comments quoted above, flexible case-by-case

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[27] *Id.* at 13045-46 ¶¶ 29-30.
[28] *Id.* at 13046 ¶ 31.
[29] *Id.* at 13046 ¶ 32.
[30] *Id.*, Statement of Commissioner Michael J. Copps; *id.*, Statement of Commissioner Jonathan S. Adelstein.

decisionmaking also helps ensure that as broadband applications change and innovate to meet future user needs, so too can network management tools needed to support those applications.

Finally, there are also legitimate business reasons to permit providers to manage certain content on their networks. Broadband providers are investing billions of dollars to deploy next-generation networks and intelligent network management designed to accommodate the voice, video, and data traffic consumers wish to send. They are doing so in a highly competitive and often unforgiving marketplace that does not guarantee a return on their investment. The business rationale for this investment rests in no small part on the expectation that providers will be permitted to develop innovative business plans and technological offerings that differentiate their networks from those of their competitors. These expectations have fueled network deployment thus far, and will likely continue to do so. Absent the prospect for any such differentiation, the rationale for building competing, redundant networks will be critically impaired.

In sum, the Commission should not adopt new prescriptive "nondiscrimination" rules designed to supplement the *Internet Policy Statement*. Such rules would undermine not only future innovation in applications and networks, or providers' opportunities and business models, but more importantly the interests of American consumers.

B. The Plan Should Call for Government Subsidization of Broadband Deployment Where Necessary.

While Cisco urges the Commission to rely chiefly on private investment for broadband deployment, a viable Plan must recognize that broadband networks, just like analog telephone networks, are simply not yet economic in some areas absent government support. In those areas, the government will need to subsidize broadband deployment. It should do so in several distinct but related ways.

First, the Commission should encourage President Obama and Congress to pursue additional rounds of federal support for next-generation networks in areas that will otherwise be left behind. The Recovery Act's broadband provisions offer an unprecedented opportunity to augment the nation's broadband infrastructure. But, as many officials have indicated, "[w]e have to view the $7.2 billion broadband investment in the stimulus package as a *down payment* on a national strategy to deliver broadband to rural Americans who can't access it and urban Americans who can't afford it."[31] The Plan should urge the President and Congress to closely monitor the current funding process, and to use insights garnered in the course of that process to shape future outlays. Like those contemplated by the Recovery Act itself, future grants should be available to entities seeking to extend high-speed services to areas that cannot economically be served without support and those seeking to improve existing offerings in such areas. Such expenditures will enhance economic opportunity, extend the reach of high-quality medical care, improve education, facilitate public safety, and otherwise further the public interest. As Acting Chairman Copps has indicated, "[h]igh-capacity networks are to the Twenty-first century what roads, canals and railroads were to the Nineteenth and highways and basic telecommunications

[31] Senator Kerry April 1, 2009 (emphasis added). *See also* Joint Press Release: Vilsack, Copps and Wade Kick Off American Recovery and Reinvestment Act's Broadband Initiative (rel. Mar. 10, 2009); Remarks of Susan Crawford, Special Assistant to President Barack Obama, available at http://www.mediaaccess.org/mapping-change/susan-crawford (April 29, 2009) ("As a very first step, a down-payment, towards this goal, the American Recovery Act calls for $7.2 billion to be given out in grants and loans …. This will not fill the broadband gap in this country, and so the FCC has been tasked with developing a national broadband plan over the coming year. We have needed a broadband plan for years, and now we are finally going to get one. We see the broadband stimulus program as part of a continuum, a seamless single silver thread … that will make forward-looking investments, that will provide metrics and proofs of concept that will be useful to the eventual FCC-led plan.").

were to the Twentieth."[32] The federal government should do as much to ensure the deployment of today's critical infrastructures as it did to ensure the deployment of the infrastructures of centuries gone by.

Second, the Commission should reform the High-Cost Universal Service program to promote the consistent improvement of existing broadband networks. In late 2007, the Federal-State Joint Board on Universal Service recommended that the Commission create a new fund to support the deployment of broadband networks in high-cost areas.[33] The Commission should adopt that proposal, creating a technologically and competitively neutral "Broadband Fund." The Broadband Fund should support not only initial deployment, but also the ongoing operational costs associated with broadband networks if necessary. Moreover, funding should explicitly be used to promote the deployment and enhancement of broadband services. For example, the Broadband Fund should be structured to grow over time, drawing down funds now used to subsidize narrowband networks, to enhance carriers' incentives to expand capacity. Likewise, the Broadband Fund should operate on a "sliding scale," offering greater benefits for providers offering faster and higher-quality service and, over time, withdraw support from providers offering "last generation" broadband service. Mechanisms such as these will ensure that residents in high-cost areas are served by offerings comparable to those available elsewhere – not only at the moment of deployment, but as time goes on as well.

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[32] *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, 23 FCC Rcd 9615, Statement of Commissioner Michael J. Copps, Dissenting (2008).

[33] *See High-Cost Universal Service Support; Federal-State Joint Board on Universal Service*, 22 FCC Rcd 20477 (Jt. Bd. 2007).

Third, the Commission should expand and make permanent the Rural Health Care Pilot Program, which connects rural health providers of all sizes to Internet backbones and thus enables rural Americans to benefit from advanced telemedicine applications. Cisco joins with the Telecommunications Industry Association ("TIA"), of which it is a member, in asking the Commission to take three steps in this regard.[34] The Commission should immediately raise the current cap on available funding. Annual funding for the Pilot Program is now capped at $139 million, leaving the majority of funds allocated to the broader Rural Health Care mechanism unused. The Commission should also expand the Pilot Program to cover remote health care monitoring services (including the mobile phones, laptops, and other devices used to provide such monitoring) for elderly Americans, as well as those suffering from chronic diseases, disabilities, or other serious health problems. Remote in-home monitoring can dramatically improve the lives of these individuals, often allowing those who would otherwise be forced to live in special-care facilities to instead enjoy the comforts of their own homes.[35] Finally, the Commission should adopt the Pilot Program (as expanded) on a permanent basis. The resulting infrastructures will serve not only the health-care institutions to which services are extended, but also others who can take advantage of shared backhaul or nearby network access points that otherwise would not exist.

In each of these areas, the federal government's efforts to promote broadband deployment cannot succeed without a nuanced and accurate tool to identify areas of need – i.e., a robust broadband inventory map. The Recovery Act directed NTIA to "develop and maintain a

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[34] *See* Letter from Grant Seiffert, President, Telecommunications Industry Association, to Michael J. Copps, Chairman, FCC, WC Dkt. No. 02-60 (Jan. 27, 2009).

[35] *See, e.g.*, John Leland, *Sensors Help Keep the Elderly Safe, and at Home*, NEW YORK TIMES, Feb. 12, 2009, *available at* http://www.nytimes.com/2009/02/13/us/13senior.html?_r=1.

comprehensive nationwide inventory map of existing broadband service capability and availability in the United States" within two years.[36] The Commission should exercise its influence to help ensure that this map is completed as quickly as possible, and is framed expansively enough to become a useful instrument in policy analysis. For example, a useful broadband map must (consistent with the above) reflect not only where broadband is and is not available, but the specific speed and quality available in different areas. The map also must reflect differing capabilities (e.g., the availability of mobile broadband service or of satellite offerings), subscribership rates, and other evidence that can guide empirical policy choices. The map must be extremely granular from a geographical standpoint, reflecting data at a household (not census tract, zip code, or MSA) level. Perhaps most of all, the broadband map – like the Plan itself – should be updated on a regular and consistent basis, to reflect evolving patterns of deployment and usage. Such a map will ensure that efforts at deployment are targeted appropriately, and designed for maximum impact.

III. THE PLAN SHOULD FOCUS ON ADOPTION AS WELL AS DEPLOYMENT.

In addition to promoting deployment, the Plan must account for the need to stimulate demand for broadband services. In many areas, consumers have declined to subscribe to broadband services that are available, very often because they cannot afford the service or do not believe it to be worth the price. For example, the Pew Internet and American Life Project ("Pew") found that 33 percent of non-subscribers cited disinterest as the chief reason for their

[36] Recovery Act at § 6001(l).

non-use, while only 13 percent cited a lack of access.[37] Asked what might prompt them to subscribe to broadband, more than one-third of dial-up users responded that "price[s] must fall."

Unsurprisingly, low-income Americans are the most likely to be left behind. Pew found last year that although 55 percent of all adult Americans had broadband connections in their homes, only 25 percent of Americans in households with annual incomes of $20,000 or less had such access.[38] The demand problem is also especially acute in rural areas: Pew found that while broadband adoption has continued to increase in rural America, the overall adoption rate of 38 percent was well below the 57 percent rate in urban areas and 60 percent rate in suburban areas.[39] While one might expect the absence of service in rural areas to be the primary culprit, this is not so: Only 19% of rural residents without broadband cite a lack of available service, whereas "[f]orty-two percent of rural residents without broadband at home say they don't subscribe because they don't need it…."[40]

As the Commission well knows, broadband service offers manifold benefits spanning all spheres of a user's life. Thus, non-subscribers miss out on a wide range of opportunities enjoyed by subscribers. To remedy this imbalance, the Commission should take several steps to stimulate demand and enhance adoption rates.

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[37] John Horrigan, *Obama's Online Opportunities: If you build it, will they log on?*, available at http://www.pewinternet.org/Reports/2009/Stimulating-Broadband-If-Obama-builds-it-will-they-log-on.aspx?r=1.

[38] Pew Intemet & American Life Project, Adoption Stalls For Low-Income Americans Even as Many Broadband Users Opt for Premium Services that Give Them More Speed 1-2 (July 2008), available at http://www.pewinternet.org/pdfs/PIP Broadband 2008.pdf.

[39] *Home Broadband Adoption 2008*, *available at* http://www.pewinternet.org/~/media//Files/Reports/2008/PIP_Broadband_2008.pdf.

[40] Connected Nation, Consumer Insights to America's Broadband Challenge (Oct. 13, 2008), *available at* http://www.nga.org/Files/pdf/0812BROADBANDCHALLENGE.PDF.

As an initial matter, the Commission should assume a deferential stance toward experimental pricing frameworks employed by providers to promote adoption. For example, providers should be permitted to create "tiered" service offerings, under which consumers with extensive needs (measured by time of use, bits transmitted and received, or some other metric) are charged more than those with more modest needs. The mobile phone market has long benefited from competition among providers offering differing "monthly minutes of use" packages; these offerings permit low-volume users, such as those who only use wireless phones during emergencies, to have access to mobile services without paying the same rates as high-volume business travelers. Mobile telephone providers now employ similar distinctions with respect to text and media messaging. There is no reason why broadband providers should not be permitted to offer tiered plans as well. Such plans – currently offered by European providers[41] – would promote the public interest by permitting low-need users to subscribe at affordable rates, without being subjected to the rates applied to users who use high-bandwidth gaming, video, or peer-to-peer applications.

The Plan should also recognize the key role that new and emerging applications will play in promoting demand. For example, high-volume streaming video applications will play an increasingly important role in telemedicine, distance learning, remote work, and other areas,

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[41] For example, PlusNet is a broadband provider in the United Kingdom that offers two tiers of service including one plan that allows up to 10 GB of usage at speeds of up to 8 Mb for £7.99 per month and another plan that offers unlimited broadband usage with speeds of up to 8 Mb for £11.99 per month. *See* PlusNet: Home & Broadband Internet Access and Phone Services UK, *available at* http://www.plus.net/?home=hometop. Similarly, TalkTalk is a United Kingdom provider that offering three different broadband offerings. *See* TalkTalk Broadband and Phone Boosts, *available at* http://www.talktalk.co.uk/products/broadband.

making broadband more and more valuable and thus bolstering demand. In particular, broadband demand is likely to be driven by the growth of four sectors:

- ***Health Care:*** The growth of telemedicine can play a leading role in promoting broadband deployment and adoption. Telemedicine services promise to improve lives in concrete ways, and therefore enhance the value of connectivity to end users in very real ways. The California Broadband Task Force, co-chaired by Cisco's Charles H. Giancarlo, recognized the importance of these offerings by including the creation of a statewide "e-Health" network as one of its seven recommendations for improving broadband deployment and use.[42]

- ***Education:*** Like telemedicine, distance learning applications can provide clear and obvious benefits to end users, driving broadband demand, as policy-makers have recognized. In his role as Virginia Secretary of Technology, new Chief Technology Officer for the United States Aneesh Chopra emphasized education-related initiatives, including the creation of an open-source web-based textbook and an online "GED On Demand" program for high-school dropouts.[43] The California Task Force also recommended that the state "leverage educational opportunities to increase broadband use."[44]

- ***Remote work/collaboration:*** Of course, American workers and businesses stand to benefit greatly from an employee's ability to work from home (either consistently or periodically) and to "meet" with colleagues in other cities or nations virtually, rather than traveling to meet in person. As discussed above, offerings such as Cisco's TelePresence product will facilitate such activities. In the process, the opportunities opened by online collaboration will fuel demand for next-generation technologies.

- ***Energy:*** Energy costs place a heavy burden on American industry, and will likely continue to do so as the nation transitions from a fossil-fuel economy toward "greener" alternatives. As President Obama and Congress have emphasized, communications technologies can play a critical role in mitigating energy costs by permitting better monitoring and managing of energy resources. The prospects for real savings in this area will increase broadband demand by utilities and their

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[42] *See The State of Connectivity: Building Innovation Through Broadband*, Final Report of the California Broadband Task Force (Jan. 2008), *available at* http://www.calink.ca.gov/pdf/CBTF_FINAL_Report.pdf ("*California Report*").

[43] *See, e.g.*, Jim Meyers, *2008 Doers, Dreamers, and Drivers*, GOVERNMENT TECHNOLOGY (Feb. 29, 2008), *available at* http://www.govtech.com/gt/articles/268510; William Jackson, *Virginia releases the first open-source textbook for public review*, GOVERNMENT COMPUTER NEWS (March 4, 2009), *available at* http://www.gcn.com/Articles/2009/03/04/Flexbook-beta.aspx.

[44] *See California Report*.

> clients, who will increasingly recognize the benefits of "smart" electricity grids for their bottom lines.

The Commission should take an active role in promoting the integration of communications offerings in each of these fields: It should review ways in which federal policy in other areas can be fashioned to promote efficient use of communications technology, host workshops that bring stakeholders together to discuss the intersection of formerly separate fields, and otherwise coordinate with fellow agencies to facilitate the consideration of broadband in federal policy policy-making. These efforts will be crucial to demand-stimulation in the coming years.

As with deployment, however, adoption efforts will very likely require the strategic use of government subsidies. To that end, the Commission should act on pending petitions to expand the Link-Up and Lifeline programs.[45] These programs now subsidize the subscription and set-up costs faced by low-income Americans in connection with traditional telephone service. The pending petitions seek to expand the programs to subsidize the set-up and subscription fees associated with broadband for low-income Americans – those who, as mentioned above, are now the least likely to subscribe. Prompt action on these petitions will help reduce subscription costs for this important demographic group, for whom costs is a key issue, thus spurring adoption.

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[45] *See Petition of Computer and Communications Industry Association for Rulemaking to Enable Low-Income Consumers to Access Broadband Through the Universal Service Lifeline and LinkUp Program* (filed Oct. 7, 2008); *Petition of TracFone Wireless, Inc. for Waiver*, CC Docket No. 96-45 (filed May 4, 2009).

CONCLUSION

Cisco respectfully asks the Commission to pursue its National Broadband Plan consistent with the arguments set forth above.

Respectfully submitted,

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